

### **REMARKS**

Claims 86-96, 101-112 and 116-123 are pending. Claims 91, 106, 112, 114, and 115 have been withdrawn by the Examiner. Claim 113 and withdrawn claims 114 and 115 have been canceled. Claims 86-90, 92-95, 101-105, 107-110, 116-118, and 120-122 have been amended without prejudice or disclaimer. Support for the claim amendments can be found in the application as filed, for example, at page 11, lines 24-26; page 29, lines 14-16; page 31, lines 11-14; and page 65, lines 9-15 and 33-34. No new matter has been added.

Applicants understand that upon allowance of a generic claim (e.g., claim 86 and/or claim 101), withdrawn claims that depend from or otherwise incorporate all the limitations of an allowable generic claim will be re-entered and considered in the present application.

#### **Information Disclosure Statement**

Applicants respectfully request that the Office consider the references cited in the Information Disclosure Statements filed on January 13, 2010 and May 28, 2010, initial the Statements, and provide copies of the initialed Statements to Applicants.

#### **Election/Restriction**

The Office at pages 3-4 of the Office Action alleges that the sequences represented by the SEQ ID NOS recited in claims 86 and 101 are independent and distinct inventions.

Applicants disagree with the Office's position. However, solely in the interest of expediting prosecution, claims 86 and 101 have been amended to recite SEQ ID NO:2 and amino acids 34-374 of SEQ ID NO:2.

#### **Claim Objections**

**Claims 86 and 101.** The Office at page 5 objects to claims 86 and 101 for reciting non-elected subject matter. Applicants submit that this objection is overcome by the claim amendments presented herein. Withdrawal of this objection is respectfully requested.

**Claims 86, 120, and 121.** The Office objects to the recitation of "Formylglycine generating Enzyme of amino acids 34-374 of SEQ ID NO:2." These claims have been amended as indicated herein. Applicants submit that the amendments overcome the rejection and respectfully request withdrawal of the same.

35 U.S.C. § 112, Second Paragraph

Applicants thank the Examiner for withdrawing the previously-raised indefiniteness rejection of claims 101-105, 107-111, and 113.

***Claims 86-90, 92-96, 101-105, 107-111, and 113.*** At page 5 of the Office Action, the Office maintains its allegations that claims 86-90, 92-96, 101-105, 107-111, and 113 are indefinite for the recitation of “the sulfatase is an activated form of an endogenous sulfatase” and “the Formylglycine Generating Enzyme is an activated form of an endogenous Formylglycine Generating Enzyme.”

In the interest of expediting prosecution, claims 86 and 101 have been amended and no longer recite these terms. Applicants respectfully request that this rejection of claims 86-90, 92-96, 101-105, 107-111, and 113 be withdrawn.

***Claims 86-90, 92-96, 98, 101-105, 107-111, and 113.*** At pages 6-7, the Office alleges that claims 86-90, 92-96, 98, 101-105, 107-111, and 113 are indefinite in the recitation of a “strong promoter,” and elements containing the same.

Solely to expedite prosecution, this term is no longer recited in these claims. Withdrawal of this rejection of claims 86-90, 92-96, 101-105, 107-111, and 113 is respectfully requested (claim 98 was previously canceled).

***Claims 86-90, 92-96, 98, 101-105, 107-111, and 113.*** At pages 7-8, the Office alleges that claims 86-90, 92-96, 98, 101-105, 107-111, and 113 are indefinite in the recitation of “expression of the sulfatase is increased” or “expression of the Formylglycine Generating Enzyme is increased.”

Solely to expedite prosecution, this term is no longer recited in these claims. Withdrawal of this rejection of claims 86-90, 92-96, 101-105, 107-111, and 113 is respectfully requested (claim 98 was previously canceled).

***Claims 86-90, 92-96, 98, 101-105, 107-111, and 113.*** At page 8, the Office alleges that claims 86-90, 92-96, 98, 101-105, 107-111, and 113 are indefinite in the recitation of “exogenous sulfatase ... and wherein expression of the sulfatase is increased” or “exogenous Formylglycine Generating Enzyme ... and wherein expression of the Formylglycine Generating Enzyme is increased.”

Applicants submit that the term “exogenous”, in the context of biotechnology, is a term of art and not indefinite. Indeed, as detailed in the application, an exogenous nucleic acid can be introduced into cells using methods known in the art. See, e.g., page 11, lines 24-28; page 39, lines 28-30. In addition, claims 86 and 101 have been amended.

For at least these reasons, withdrawal of this rejection of claims 86-90, 92-96, 101-105, 107-111, and 113 is respectfully requested (claim 98 was previously canceled).

### 35 U.S.C. § 101

The Office rejects claims 86-90, 93-96, 101-105, 108-111, 113, 116, 118, and 123 as allegedly being drawn to non-statutory subject matter for reciting products of nature (Office Action at page 9).

As amended, claims 86 and 101 recite a sulfatase producing cell that, *inter alia*, expresses an endogenous sulfatase, wherein the gene encoding the endogenous sulfatase comprises a heterologous promoter upstream of an endogenous sulfatase gene genomic locus, or an exogenous sulfatase encoded by heterologous DNA introduced into the cell; and the cell expresses an endogenous Formylglycine Generating Enzyme, wherein the gene encoding the endogenous Formylglycine Generating Enzyme comprises a heterologous promoter upstream of an endogenous Formylglycine Generating Enzyme gene genomic locus, or an exogenous Formylglycine Generating Enzyme that is encoded by heterologous DNA introduced into the cell.

As these amendments make clear, the cells in claims 86 and 101 contain a gene encoding the endogenous sulfatase or Formylglycine Generating Enzyme that comprises a heterologous promoter upstream of an endogenous sulfatase gene genomic locus, or an exogenous sulfatase or Formylglycine Generating Enzyme encoded by heterologous DNA introduced into the cell. Cells containing such elements are not products of nature. For at least these reasons, Applicants respectfully request that this rejection of claims 86-90, 93-96, 101-105, 108-111, 113, 116, 118, and 123 be withdrawn.

35 U.S.C. § 112, First Paragraph: Written Description

***Claims 86-90, 92-96, 101-105, 107-111, 113, and 116-123.*** At pages 9-10, the Office rejects claims 86-90, 92-96, 101-105, 107-111, 113, and 116-123, and alleges that Applicants have failed to demonstrate possession of the subject matter recited therein.

The rejection focuses on the term “activated by insertion of strong promoter.” As indicated in the amendments presented herewith, this term is no longer recited in the amended claims. Further, the amended claims recite a gene comprising a heterologous promoter upstream of an endogenous gene genomic locus. As described in the application, such genes are known in the art. See, e.g., page 48, lines 6-24; page 49, lines 8-21; and page 65, lines 3-15. For at least these reasons, Applicants submit that the amendments obviate this rejection and respectfully request that this rejection of claims 86-90, 92-96, 101-105, 107-111, 113, and 116-123 be withdrawn.

***Claims 92-94 and 107-109.*** The Office alleges at pages 10-13 that these claims fail to satisfy the written description requirement, and states:

[T]hese claims encompass an embodiment wherein the cell is prokaryotic or non-human, yet the FGE of SEQ ID NO:2 or 95% identical is endogenous. The FGE of SEQ ID NO:2 is a human FGE and there is no evidence of record that the FGE of SEQ ID NO:2 or 95% identical variants are endogenous to a cell other than a human cell. (Office Action at page 10)

Applicants submit that the claim amendments presented herewith overcome the rejection. Withdrawal of this rejection is requested.

35 U.S.C. § 112, First Paragraph: Enablement

***Claims 86-90, 92-96, 101-105, 107-111, 113, and 116-123.*** The Office at pages 13-18 alleges that claims 86-90, 92-96, 101-105, 107-111, 113, and 116-123 are not enabled. Applicants respectfully disagree with the Office’s positions.

First, with respect to the Office’s remarks about the terms “activated form” and “activated by insertion of a strong promoter,” these terms are no longer pending in any of the claims. Thus, the rejections with respect to these terms have been overcome.

Next, the Office alleges:

the term “exogenous” is commonly defined in this context as an object coming from outside of the system and is broadly and reasonably interpreted as encompassing a sulfatase and FGE that are produced *outside* of the cell. Yet the claims require that the

exogenous sulfatase and FGE have increased expression, indicating that they are produced within the cell. (Office Action at page 15).

In the interest of expediting prosecution, and as discussed above, claims 86 and 101 have been amended and recite, in part, an exogenous sulfatase/Formylglycine Generating Enzyme encoded by heterologous DNA introduced into the cell. Applicants submit that methods of introducing heterologous DNA into a cell are known in the art. See also, e.g., page 28, line 16 to page 31, line 29 of the application as filed.

Applicants submit that the subject matter of the amended claims is enabled and respectfully request that this rejection be withdrawn.

**Claims 92-94 and 107-109.** At pages 13-18, the Office also alleges that claims 92-94 and 107-109 are not enabled. The Office alleges that there is no evidence that the Formylglycine Generating Enzyme of SEQ ID NO:2 or 95% identical variants “are endogenous to a cell other than a human cell” (Office Action at page 16).

Applicants submit that the amendments presented herewith overcome the rejection. Withdrawal of this rejection is respectfully requested.

35 U.S.C. § 102/103

**Rommerskirch et al. (Proc. Natl. Acad. Sci USA 89:2561-2565 (1992); “Rommerskirch”).** The Office maintains its rejection and alleges that claims 86-90, 93-96, 101-105, 108-111, and 113 are anticipated, or rendered obvious, by Rommerskirch, as evidenced by Dierks et al. (*Cell* 113:435-444 (2003); “Dierks”) and Wraith et al. (*Human Genet.* 87:205-206 (1991); “Wraith”). Applicants respectfully disagree with the Office’s position.

For example, the Office has not identified anything in Rommerskirch that teaches or suggests:

- a sulfatase, wherein the sulfatase is an endogenous sulfatase, wherein the gene encoding the endogenous sulfatase comprises a heterologous promoter upstream of an endogenous sulfatase gene genomic locus; or

- a sulfatase, wherein the sulfatase is an exogenous sulfatase encoded by heterologous DNA introduced into the cell; or

- a Formylglycine Generating Enzyme, wherein the Formylglycine Generating Enzyme is an endogenous Formylglycine Generating Enzyme comprising amino acids 34-374 of SEQ ID

NO:2 or SEQ ID NO:2 (or an amino acid sequence that comprises an amino acid sequence that has at least 95% identity to the amino acid sequence of amino acids 34-374 of SEQ ID NO:2 or SEQ ID NO:2), wherein the gene encoding the endogenous Formylglycine Generating Enzyme comprises a heterologous promoter upstream of an endogenous Formylglycine Generating Enzyme gene genomic locus; or

- a Formylglycine Generating Enzyme, wherein the Formylglycine Generating Enzyme is an exogenous Formylglycine Generating Enzyme comprising amino acids 34-374 of SEQ ID NO:2 or SEQ ID NO:2 (or an amino acid sequence that comprises an amino acid sequence that has at least 95% identity to the amino acid sequence of amino acids 34-374 of SEQ ID NO:2 or SEQ ID NO:2) that is encoded by heterologous DNA introduced into the cell.

Dierks and Wraith fail to remedy these deficiencies.

For at least these reasons, Applicants submit that claims 86-90, 93-96, 101-105, 108-111, and 113 are not anticipated, or rendered obvious, by Rommerskirch. Withdrawal of this rejection is respectfully requested.

**CONCLUSION**

Applicants respectfully submit that all of the pending claims are in condition for allowance, which action is expeditiously requested. Applicants do not concede any positions of the Examiner that are not expressly addressed above, nor do Applicants concede that there are not other good reasons for patentability of the presented claims or other claims.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, please charge any deficiency to Deposit Account No. 50/2762.

Respectfully submitted,  
*von Figura et al., Applicants*

By: /Laurie Butler Lawrence/  
Laurie Butler Lawrence, Reg. No. 46,593  
LANDO & ANASTASI, LLP  
One Main Street  
Cambridge, Massachusetts 02142  
United States of America  
Telephone: 617-395-7000  
Facsimile: 617-395-7070

Docket No.: S2071-702810  
Date: June 2, 2010